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THE AVICULTURAL SOCIETY

The Avicultural Society was founded in 1894 for the study of British and foreign birds in the wild and in captivity. The Society is international in character, having members throughout the world.

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The AVICULTURAL MAGAZINE welcomes articles and news items from both members and non-members (no payment is made). These can be about any aspect of aviculture, conservation or natural history concerning non-domesticated bird species that is likely to be of interest to aviculturists. Articles submitted for publication should preferably not have been published elsewhere, and should ideally be written in English, though translation is possible. Scientific as well as vernacular bird names should be given, and references cited in the text should be listed at the end of the article. Material can be sent as an e-mail attachment to editor@avisoc.co.uk and can be accepted in most common file formats. Files on disk and type- or handwritten manuscripts are also accepted. Line drawings, black and white or colour photographs can be used to illustrate articles and should be clearly captioned. Tables and graphs will be used whenever possible, but authors must be aware of the constraints of reproduction particularly with regard to the width of the page of the magazine, which is 105mm. Graphs should ideally be accompanied by the relevant source data.

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AVICULTURAL MAGAZINE

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FROM THE CHAIRMAN

I hope you will be pleased to note that with this magazine we are making progress in bringing publication forward, and the gap between this issue and the next should be even shorter. We will do our best to continue this progress through 2014, and of course you can help by contributing articles.

Thank you to all those who have sent completed questionnaires to Geoff Masson. If you haven't, it's not too late, and if you have lost the form it is available from the website. Geoff tells me that the forms received so far contain some interesting and useful suggestions.

This year's spring social meeting and AGM will take place at Lotherton Hall Bird Gardens on April 26th, followed by a visit to Richard Green's collection, also in Yorkshire, on April 27th. UK members should find booking details inserted into this magazine. Overseas members are also very welcome and we are happy to send meeting details on request, or they can be found on the website. Our online presence is now enhanced by a facebook group called The Avicultural Society.

Other dates for your diary are the autumn social meeting to be held at Beale Park on September 13th and a weekend trip to France planned for later in September, to include a visit to the unique collection of our vice-president Dr Quinque along with other interesting collections. Look out for more details later as plans are confirmed. Arrangements for a summer social meeting are also under discussion.

For some time we have invited members of the International Turaco Society to join us at our meetings. We are now invited to attend the ITS AGM where there will be some interesting speakers. See News & Views for details.

Kate Atwell has now taken over from Peter Stocks as Treasurer. Our thanks go to Peter & Kay for their hard work over the last five years. Thanks also to you, our members, for your patience during a difficult period for the society from which we are now emerging. If you have yet to renew your subscription for 2014 please do so as soon as possible, either via the website or directly to Kate at the address inside the front cover.

Nigel Hewston

HAVING BEEN AN AVICULTURIST FOR FIFTY YEARS
Part 5

by Bernard Sayers

Another Mecca for Cliff Palmer and me were the twin collections of the Ornamental Pheasant Trust and Norfolk Wildlife Park which co-existed on the same site at Great Witchingham in the North of the county. In fact we visited these collections so frequently in the 1960s that Cliff’s Ford Anglia virtually knew its own way there! Round the Norwich ring road to the A 1067 Fakenham exit and about fourteen miles yonder to the village of Great Witchingham and there, on the comer of the righthand turn to Reepham, were these two wonderful collections. They were set up by Philip Wayre and his wife Pat and, in their prime, almost certainly exhibited the most comprehensive collections of pheasants and European wildlife ever opened to the public in the U.K. Philip Wayre has had a lifelong interest in natural history and whilst still at school at Sherborne practised falconry along with his school friend Gordon Jolly. Here I must apologise in advance because I am off on another ramble, because Gordon Jolly was later to play a part in thwarting some of my avicultural ambitions. In my early days of birdkeeping, large numbers of birds of prey were imported and sold very cheaply to anyone who had the money to buy them. The birds were kept and transported in deplorable conditions and often arrived in a pitiable state. Many were bought on impulse by people who had no knowledge of their proper care and the mortality rate was horrific. Clearly something had to be done to curtail this cruel traffic. The Department of the Environment, which was the precursor to DEFRA, decided to introduce a system whereby intending importers of raptors were required to obtain permits and, as a means of ensuring that the applicant possessed adequate knowledge of caring for birds of prey, membership of the greatly respected British Falconers’ Club was a significant criterion. I already had a few hawks and eagles and a single king vulture, but most of my birds were either singletons or what I suspected were unisex pairs; remember this was long before surgical or DNA sexing became possible and I had to rely on observing behaviour and the size of the birds because with most birds of prey except vultures the females are significantly bigger than the males. I had already bred a few hawks in my aviaries, but I wanted to pair up my odd birds so that I could breed more. Accordingly I applied for the necessary permits to import the birds I needed for my breeding programme only to have my application refused by the D.O.E. However, an official advised me “Off the record” that any future applications would be viewed more favourably if I became a member of the B.F.C. I duly applied for membership candidly explaining that I had no plans to take up falconry, but my interests centred solely on captive breeding. The secretary of the B.F.C. at that time was the same Gordon Jolly who had helped Philip Wayre at Sherborne and I promptly received a curt refusal to be allowed to join the Club. I was refused membership for three reasons;-

I. I was not an active falconer which was a fair point. Indeed I have always held rather ambivalent views about falconry. On the one hand I admire the superb condition of the birds flown by good falconers and am greatly impressed by the rapport between bird and man which allows a falcon to be flown at quarry and have it return to its handler. However, the downside is that I have always detested seeing birds of prey tethered and include this practice with other personal aversions such as parrots chained to stands and hobbled elephants. Happily, the latter two practices are now rarely seen in this country and I sincerely hope will be consigned to the more infamous chapters of history. Unfortunately, one still sees countless birds of prey tethered to blocks or bow perches at the many falconry establishments around the country. I suppose if the bird is flown daily for a generous period it may be viewed as acceptable, but what a tedious existence for birds to spend most of their lives on the end of a leash. Surely it would be possible in most cases to provide the birds with a good sized, carefully designed aviary for their non- flying time, or, better still, give them a more fulfilled existence by keeping them as pairs and encouraging them to breed.

II. I was proposing to keep hawks and eagles behind “wire netting” which was I gathered a heinous crime. Whilst it is true that some birds of prey such as goshawks and sparrowhawks are highly strung and skittish and may injure themselves on wire netting, most raptors can be kept and bred perfectly satisfactorily in aviaries with three enclosed sides and a wire front. In fact some pairs need less seclusion than this design offers. All of my birds, including a crested goshawk, were kept in conventional aviaries which offered the occupants a sense of security and they remained in perfect condition with no damage to their ceres or feathering.

III. I required the birds for breeding which, I was told, was simply not practicable and the fact that I had already successfully bred three species of diurnal raptors apparently accounted for nothing. So I was refused membership of the B.F.C. and this, in turn, precluded me from obtaining the permits necessary to pair up my birds. It was for these reasons that I reluctantly decided to dispose of my hawks and eagles and instead specialise in owls where I hoped I would not encounter these problems.

Well folks, after that somewhat lengthy ramble or was it a rant (!) I am now back at Great Witchingham. Philip Wayre served as a naval officer during the Second World War and after being invalided out of the service he bought Hawks Hill Farm in Great Witchingham and started a poultry and turkey rearing business. However, in parallel, he gradually assembled a private zoo of exotic animals, travelled quite widely to study and film wildlife and undertook lectures and filmtours. Philip is ideally suited to lecturing because although quite small in stature he has a commanding presence, a rich tonal voice and perfect diction. In short he is very easy to listen to and a first class communicator. In fact I often thought that if his career path had taken a different direction he would have made an excellent television presenter/interviewer.

As added attractions at these lectures Philip was accompanied by Bubo a trained European Eagle Owl *Bubu b. bubo* and Bokhara a trained Golden Eagle *Aquila chrysaetos*. Bubo is the scientific name for an eagle owl, but Bokhara employs a little more imagination because it is a city in Uzbekistan an area which is home to the huge race of golden eagle known in Central Asia as Birkhuts. These are almost twice the size of our Scottish birds. Indeed the Mongols have trained these huge eagles to fly at wolves and with considerable success. However, Philip's birds came from Finland and, although larger than its Scottish counterpart, it was not nearly as big a Birkhut. In 1959, following discussions with the Council of the Avicultural Society, it was decided that pheasants had become poorly represented in European collections and, with the serious threats facing many species in the wild, a captive-breeding programme needed to be inaugurated with some urgency. The focus was to be to establish strong captive populations of as many species as possible within an ultimate purpose of being able to offer stock for reintroduction programmes. It was agreed that an Ornamental Pheasant Trust be set up under the aegis of the Avicultural Society with the breeding collection to be established at Hawks Hill, Great Witchingham with Philip as Director. The Trust was formally initiated in 1961. In parallel to the formation of the O.P.T. Philip and his wife Pat had been thinking about expanding their private zoo and opening it to the public. This, in part, had been prompted by the loss of the stock of poultry and turkeys to fowl pest and the need to decide how best to employ the compensation. It was decided to establish a European Wildlife Park which would be virtually unique in the U.K. and this opened to the public in August 1962. Philip and Pat's farm at Hawks Hill consisted of a venerable old farmhouse formed by joining and extending two cottages with about fifty acres of meadowland. Surrounding the farm were extensive buildings for housing poultry and about twenty acres of reasonably flat meadow. Between this and the Reepham road, which bounded the far side of the property, was about thirty acres which formed a valley with gently sloping sides. It was decided that the thirty acre valley would become the Wildlife Park and the twenty acres of flat meadow would become the site for the Ornamental Pheasant Trust's collection. However, the divide was not absolutely clear cut because some of the OPT's birds were housed in the Park open to the public and as the collection of European wildlife grew and more space was needed, large enclosures for wisent or European Bison *Bison bonasus*, Lynx *Felis lynx*, and Brown Bears *Ursus arctos* were erected in what had been the private area. Although the collections of the Ornamental Pheasant Trust and the Norfolk Wildlife Park were somewhat intermingled it would probably be more understandable to the reader if I dealt with them separately. Near to the entrance gate to the park with the adjacent office and restaurant there was a walk-through pheasant enclosure. This was a good-sized grassed enclosure planted with shrubs and with two shelters in areas fenced off from the public. Because of its size it was not roofed and the birds must have been wing clipped, pinioned or brailed. This enclosure contained a colourful collection of Peafowl *Pavo cristatus* and cocks only of such colourful species as Golden *Chrysolophus cristatus*, Silver *Lophura n. nycthemera*, Lady Amherst's *Chrysolophus amherstiae*, Himalayan Monal *Lophophorus impeyanus* and Blue Eared Pheasants *Crossoptilon auritum*. Although cock pheasants are highly territorial and aggressive towards other males this arrangement seemed to work quite well. I guess it worked because of the enclosure's large size, generous cover, the fact that no females were present and since it contained a large number of birds any pheasant that was being bullied quickly became lost in the crowd. Certainly this display was very popular with the public, particularly with photographers. About mid-way across the park running more or less on its central axis was a high, dense hedge. Looking across from the cafeteria, on the far side of the left-hand end of this hedge was a block of very large aviaries. These had substantial, heated shelters in the middle and were, I think, purchased from the Leckford Abbas collection of Spedan Lewis. Certainly the Leckford collection was reduced to a commercial waterfowl collection at around the same time that the Ornamental Pheasant Trust was formed and I know that Philip Wayre bought what remained of the pheasants. Being on a sunny, sloping site, backed by a sheltering hedge and with snug, heated shelters these pens were reserved for the Trust's tropical species of pheasants which are somewhat delicate. They contained Palawan Peacock Pheasants *Polyplectron napoleonis*, Vieillot's *Lophura ignita rufa* and Bornean Crested Firebacks *L. i. ignita* and both the Malayan *Argusianus a. argus* and Bornean *Argusianus a. grayi* races of the Great Argus Pheasant. This remains the only occasion I have seen the Bornean great argus and it may have been the last time this rare species was exhibited in a European collection. Many of the rare species acquired by the Trust were received from Dr. Ken Searle. Dr. Searle had a medical practice in Hong Kong and had a very keen interest in aviculture. He mounted a special expedition to the island of Borneo to collect the Bornean Crested Firebacks and the Bornean great argus and from his contacts amongst the animal dealers of Hong Kong he obtained other birds such as Cabot's Tragopans *Tragopan caboti* and a single White Eared Pheasant *C. crossoptilon*. This was the first live White Eared Pheasant I had seen and did, of course, pre-date the two pairs later purchased by Jersey Zoo and Shep Mallet (John a.k.a Shep Mallet was curator of birds at Jersey Zoo at this time). To the best of my knowledge the Trust bird, which was I think a female, never bred because it was not possible to obtain a mate for it. Fortunately, after rather a bumpy start, the Jersey birds bred very well and were the founders of the stock we have today.

Before we move on, Dr. Ken Searle deserves more mention for the sterling work he has done for so many years. The standard practice at London Zoo was to give the origin of their animals on their cage labels. Thus it was customary to see succinct data like "born in the menagerie", "purchased", "received in exchange" and "presented by" followed, where applicable, with a name and a date. Many labels for species as diverse as orang-utans, hog badgers, ferret badgers, martens and many birds quoted the origin as "presented by Dr. K. Searle" and for several years I wondered who Dr. Searle was. Later I met Dr. Searle, albeit briefly, at a meeting of the Avicultural Society. Not only was Dr. Searle a generous benefactor to collections like London Zoo and the Ornamental Pheasant Trust he somehow also found the time to be the curator of the zoo in the Hong Kong Botanical Gardens. This zoo exhibits some mammals, but under Dr. Searle's curator ship it became better known for its excellent bird collection and its highly creditable breeding achievements. To name just three, the Mountain or Rothschild's Peacock Pheasant *Polyplectron inopinatum*, African Pigmy Goose *Nettopus auritus* and Red Bird of Paradise have, I believe, bred successfully at the Hong Kong Botanic Gardens.

The remaining block of pheasant aviaries in the Norfolk Wildlife Park were on an elevated site in the top, right hand corner of the park looking across the valley from the cafeteria. These, as with all the pheasant breeding enclosures at the O.P.T. were large, grass-floored aviaries with a central shelter. Although not planted, conifer branches laid in the corners provided cover for security or nesting. These aviaries housed hardy species such as Satyr *T. satyri* and Temminck's Tragopans *T. temminckii*, Blue Eared and Brown Eared Pheasants *C. manturicum*, Himalayan Monals, Elliot's *Syrmaticus ellioti* and Mrs Hume's Bar-tailed Pheasant *S. humiae* and common Koklass pheasants *Pucrasia macrolopha*.

The Koklass pheasant saga is quite amazing and shows the hand that fate can play. This mountain species from the Himalayas had been considered difficult to manage in captivity because, in common with most birds from high altitudes, cold climates, or maritime environment, they do not normally encounter many of the infections encountered in mild, humid countries and so have very little natural immunity to them. Given this background, imagine Philip Wayre's amazement when he visited Palmer's Pet Stores in Camden Town and saw a recently imported pair being offered for sale. The pair appeared to be a male and a female although the latter looked to be in poor condition and there were serious doubts that she would survive. Philip immediately bought the pair and fortunately with careful nursing at Great Witchingham the female did recover and this pair went on to breed very successfully. Fred Johnson is credited with the first captive breeding of the Koklass pheasant, but it was at Great Witchingham that large numbers were bred which soundly established this interesting species in aviculture. Sadly the wheel has now almost gone full circle because very few Koklass pheasants survive in British collections today. This is not due to any undue difficulties in managing them, but is the result of declining interest in aviculture which has seen many species of pheasants (and other birds of course) reduced to perilously small populations.

I was a member of the Ornamental Pheasant Trust and for what now sounds like a trifling sum of £1.00 annual membership I could enjoy unlimited access to both the Norfolk Wildlife Park and the private section which housed most of the pheasant collection, an excellent annual report and, most important of all, first offer of any surplus stock. However, to bring this charge into perspective I should point out that as a trainee technician at the Marconi Company my salary at that time was £5.00 per week!

Here I would like to describe the incubating and rearing methods at Great Witchingham which were, to my mind, difficult to improve upon although they did demand a great deal of space and were very labour intensive. My first preference is to allow pheasants to incubate their own eggs and parent-rear the chicks. Unfortunately many pheasants are rather nervous and highly strung or live in polygamous groups which makes parent-rearing impracticable. A flock of some four hundred Silky crossed with Light Sussex bantams was maintained at Great Witchingham to do all of the incubation. Even today when there are very sophisticated and accurate incubators on the market I still favour broody bantams. At any one time during the breeding season there were around one hundred broodies incubating eggs and these were housed, under cover, in one of the long, disused poultry buildings. The broody boxes were setup in a long line on a platform constructed by building two parallel walls of breeze blocks and infilling the gap between them with earth. Thus the eggs could be set in a hollow in the earth lined with hay since the broody boxes had no bottoms. Across a gangway was a line of wire cages again raised up to working height. This allowed an attendant to lift each bantam off the eggs on a daily basis and place it in the facing cage where it could feed and drink. Whilst the bantam was in the cage it allowed the eggs to air and it gave the attendant the opportunity to check and mist them if required. Once the eggs hatched, the chicks and broody were removed to a small coop with supplementary electric heating. After two or three weeks the poults were separated from their foster mother and moved to a larger coop, but still with additional electric heating. And finally, when feathered, the poults were moved to fold units. These fold units were known as Whitlocks after the name of the company in Great Yeldham who made them. They were about 8ft square and 4ft high and were set out on grass where they could be slid onto clean grass every few days. Each fold unit could hold up to about eight young pheasants.The young pheasants bred at Great Witchingham were invariably of superb quality. Wherever possible strong parent stock was employed and the rearing methods ensured that they had the best start. Whilst this programme was in progress the Ornamental Pheasant Trust's breeding successes made a huge contribution to aviculture and potentially to conservation. Most of the breeding stock of pheasants was kept in the private section of Great Witchingham which was probably a sensible arrangement. Pheasants will, of course, breed perfectly successfully in collections open to the public providing there is plenty of cover where the birds can seek refuge when frightened. However, pheasants are easily spooked and, knowing how uncaring a minority of visitors are, keeping much of the breeding stock undisturbed probably contributed to the excellent breeding results at Great Witchingham. The breeding pairs were housed in a row of very large, grass floored aviaries which ran the entire length of the off-show area.

Before leaving this subject, mention must be made of a great rarity which was included in the collection - a female Western Tragopan *T. melanocephalus*. The Ornamental Pheasant Trust received a pair of these very rare pheasants, but sadly the male died soon after arrival. However the female lived for several years and was kept with a male Temminck's tragopan. She laid eggs every year and I have some of them in my reference collection of captive-laid eggs, but I am unaware of any hybrid being reared. Interestingly the tragopans inhabit the suitable altitudes of the entire range of the Himalayas and, as the name suggests, the western tragopan comes from the western end of this huge area. It is also much the darkest in colour and the five species of tragopans become paler in colour as they run eastwards until the beautiful Cabot's tragopan with its muted shades of buff, cream, orange and chocolate.

What happened to the Ornamental Pheasant Trust? Well, sadly it was relatively short lived. I am not aware of all of the reasons for its closure although I think I can guess what some were. Running any collection of animals open to the public is an enormously demanding task requiring immense energy, focus and business expertise and Philip Wayre had two to look after with the Norfolk Wildlife Park and the Ornamental Pheasant Trust. It is true they occupied the same site, but they were very different collections which undoubtedly required different management techniques. So I suspect that, in time, he found the twin tasks enormously burdensome. Also, with the formation of the World Pheasant Association, support was reduced. I well remember attending the inaugural meeting of the W.P.A. on 7th September 1975. This meeting was held in the lovely grounds of Jean and Keith Howman's home at Shepperton - on -Thames and it was the beginning of an organisation which has made an enormous contribution to the conservation and study of Galliformes. However, it was never the W.P.A's intention to maintain a comprehensive breeding collection of gamebirds although, for a time, a representative collection was on show at their headquarters at Beale Park near Reading. I viewed the two organisations as complimentary and was pleased to support both, but some members of the Ornamental Pheasant Trust moved their support to the W.P.A. and this was another factor which brought about the closure of the O.P.T. Although I accept that, given the circumstances, closure of the O.P.T. was virtually unavoidable I am still very sorry that it became necessary. Now there is no comprehensive collection of Galliformes open to the public in the U.K. Even the nice collection at Beale Park is much reduced now that the headquarters of the W.P.A. has relocated. It was always my hope that the Ornamental Pheasant Trust would follow the same progress as the Wildfowl Trust which was established by Sir Peter Scott at Slimbridge and now has centres around the country. But it wasn't to be and pheasants and the cause of conservation are the losers.

Now let us turn to the Norfolk Wildlife Park. Although Pat and Philip Wayre had decided to concentrate on the European fauna when the Park first opened it contained a number of exhibits from their private collection which didn't fit this theme. For instance there was a nice breeding herd of Barbary wild sheep, on a fallen tree trunk lived liberty pairs of Scarlet *Ara Macao* and Blue and Gold Macaws *Ara ararauna*, and there were Rheas *Rhea americana* and a binturong *Arctictis binturong*. Also, a very popular occupant of the Park was Pooh a Malayan Sun Bear *Helarctos malayanus*. Pooh was bought as a cub from Palmer's Pet stores in Camden Town and reared by Pat and Philip Wayre. He had a particularly close bond with Pat. As his enclosure was on the edge of the Park with a wire tunnel into the private area. Pat regularly took Pooh for walks with the family dogs until he displayed the temperament for which bears are notorious. One day, whilst out for their walk. Pat tried to coax Pooh to stay with the group when he turned on her and badly mauled one of her legs.

Oh, dear folks, here comes another digression! My wife is Thai and during our visits to Thailand we have made many friends who have private zoos or who work in public collections. The Thai keepers form very close bonds with their charges and go in with almost everything. When visiting these collections it is quite common for guests to be invited by the keepers to go into the enclosures to meet their animals. During these visits I have been taken into enclosures to meet full grown tigers, leopards, crocodiles, magnificent bull elephants and other potentially dangerous animals. However, courage failed me (or was it good sense prevailed) when I was invited to go into a large, grassed enclosure with seven adult Asian black bears. I rather upset their keeper who pointed out that I had already been taken in with several of his colleague's charges and I certainly had no wish to cause offence, but I viewed the meeting as being too risky. The big cats are certainly dangerous, but they are reasonably demonstrative and give warning signs that they are becoming annoyed and it is time to leave them alone. However, bears are entirely inscrutable and give little or no warning of mood changes. Their moods can change in a split second and, given their formidable teeth and claws and their immense strength, you have some idea of why I did my impersonation of a chicken. Further, with seven animals present, these risks were multiplied sevenfold. But maybe I should attribute my refusal to enter the bears' enclosure to my disability - I was born with a yellow streak down my back!

This exotic stock was quickly phased out and thereafter the Norfolk Wildlife Park concentrated on European fauna. All of the enclosures were large and were landscaped and planted to resemble the occupants' habitat as closely as possible. Where practicable on the public side, ha - has (dry ditches) were used as boundaries, but where the more agile animals needed to be totally enclosed wire and rustic pole structures were erected. There were none of the old fashioned heavily barred, concrete floored enclosures and every attempt was made to keep the enclosures harmonious with the landscape.

Turning to the left from the entrance was a crescent of large paddocks for the deer. The first contained a group of reindeer *Rangifer tarandus* obtained from the herd established at semi-liberty in the Cairngorms. Although reindeer were part of the British fauna, they became extinct long ago. In fact there is considerable debate as to exactly how long ago, but the most recent estimate suggests thereabouts a thousand years ago. The Cairngorm herd was established by Mikel Utsi when he imported eight Swedish mountain reindeer in April 1952 followed by additional animals in later years. I have never had the pleasure of visiting the Cairngorms, but I did meet Mr and Mrs Utsi because they maintained a home at Harston near Cambridge which is not too far from my own home. The Utsis looked a somewhat incongruous couple and were two of the great characters of the zoo scene in the U.K. Mikel was a short, stocky man with a mischievous sense of humour. He was born into a reindeer herding Sami family and he would sometimes wear his brightly coloured traditional dress. His wife Dr Ethel Lindgren was from a Swedish - American family and I believe was brought up in America. She had a prodigious intellect and is said to have been fluent in English, Swedish, French, German, Russian, Dutch, Mongol and Tungu. She had studied psychology and anthropology at Cambridge University and seemed to have knowledge of and views on almost any subject one cared to mention. She was a huge woman and with her immense charisma and entertaining conversation she dominated any gathering. If this were not enough she was notorious for her trademark wolf-skin coat which she rarely seemed to be without. Undoubtedly it was warm, but it was accompanied by a pungent, gamey bouquet which suggested that the previous occupant had not long dispensed with it - and was none too scrupulous about personal hygiene! Mikel died in 1979 and Dr Ethel Lindgren in 1988. However, they left a legacy of a well-established herd of reindeer in the Cairngorms which has provided stock to many zoos and wildlife parks. The Cairngorm herd of reindeer is still thriving and was taken over by Tilly and Alan Smith after the death of the Utsis.

Great Witchingham exhibited, and indeed bred, all of the European deer with the notable exception of the elk (called moose in North America). There was undoubtedly some good reason for this absence. Elk are huge animals, indeed by far the largest of the world's deer, with bulls measuring about 6ft at the shoulder and weighing half a ton. The American form, the moose, is even larger with particularly fine bulls measuring 7ft 6in at the shoulder and weighing over three quarters of a ton. The antlers vary by a similar ratio spanning about 4ft in European animals whereas a spread of 6ft is not that uncommon in Alaskan specimens. Not only are elk rather difficult to maintain in captivity, but the bulls become incredibly dangerous during the rut. In fact many years ago I was staying with a friend who worked at Neumunster Zoo in the north of Germany, which also specialises in European fauna, when the bull elk attacked and almost killed its keeper. These characteristics have resulted in very few elk being exhibited in British collections. In fact I can only recall two occasions. Long ago I remember seeing a family group at Whipsnade and this collection is now breeding them again, and currently there are some in the Highland Wildlife Park.

Sometime ago a keeper working with ungulates at London Zoo good naturedly chided me for making a hash of naming the males and females of different species of deer. I think the elk/moose is the only species called a bull and cow although I have heard reindeer sometimes referred thus. Roe deer and fallow deer are referred to as bucks and does whereas red deer are known as stags and hinds. Confused? Well I am not surprised and just to confuse readers further young elk/moose and red deer are known as calves, young roe deer are kids and the correct appellation for young fallow deer is fawn. There seems to be a great deal in favour of concentrating on birds!

The species of deer at Great Witchingham were red, fallow, roe, muntjac and Chinese water deer. It is only the red and roe deer which are indigenous to Britain. The fallow deer was probably introduced by the Normans although some authorities suggest the introduction took place much earlier by the Romans. This species was specifically introduced for sport. The introduction of Sika, Muntjac *Muntiacus reevsi* and Chinese Water Deer *Hydropotes inermis* occurred accidentally when animals escaped from the deer park at Woburn around a century ago. The last paddock in this corner of Great Witchingham contained a huge pile of rocks and was home to a breeding group of Alpine Ibex *Capra ibex*; the only one I remember seeing in this country. Then came an enclosure for Wild Boar *Sus scrofa* and the roof of the boar's concrete shelter provided a vantage point to look over a conifer plantation which contained a pair of Iberian Wolves *Canis lupus*. Again these were the first examples of this southern sub-species of the grey wolf I remember seeing in this country, although there is now a pack at Port Lympne Wild Animal Park. They are smaller and of lighter build than the northern animals.

Dotted around the sloping grassland in front of the deer paddocks were numerous interesting exhibits. These included two walk-through aviaries. One was a large lofty structure built over fair-sized trees. In fact initially the builders failed to take into account the huge weight of the structure and it collapsed when almost complete. However, it was rebuilt with steel roof trusses and all was well. At one end of this aviary was a high cliff of natural stone down which tumbled a waterfall. This water fed a stream and chain of pools and was then recirculated to the top of the cliff. A path meandered through this enclosure and visitors were able to stand quietly and wait for the resident birds to show themselves. This aviary contained a nice breeding flock of Black-crowned Night Herons *Nycticorax nycticorax* which invariably had nests in the tops of the trees during summer. A flock of Alpine Choughs *Pyrrhocorax graculus* showed their approval of this aviary by breeding on ledges on the artificial cliff - a first breeding for the Norfolk Wildlife Park in 1970. Whereas our resident Red-billed Chough *P. pyrrhocorax* has a down curved red bill, in the Alpine species the bill is short, straight and yellow in colour. There was also a very successful breeding flock of Azure-winged Magpies *Cyanopica cyanus*. This attractive corvid has a quite exceptional discontinuous geographic distribution. One population, with a diagnostic white tip to their tails, is found in Spain and the other population occurs in Mongolia, China and Japan and nowhere else in the many thousands of miles between these two areas. The other walk-through aviary was much smaller and, from memory, I would guess it was about 50ft x 25ft. This had a path along the middle and both sides were planted with indigenous shrubs. It was stocked with our native Passerines, mainly finches and buntings.

Dotted around this side of the valley were numerous, large planted aviary type structures constructed from wire on a framework of rustic poles. These contained several species of owls (Ural *Strix uralensis*, Tengmalm's *Aegolius f. funereus*, Long-eared *Asio otus*, Little *Athene noctua*, Tawny *S. aluco* etc) and a number of the smaller mammals such as Red Squirrels *Sciurus vulgaris*, Pine Martin *Martes martes* and Scottish Wildcats *Felis silvestris*. There were moated enclosures for Racoon Dogs *Nyctereutes procyonoides* (the only species of dog to hibernate) and Arctic Foxes *Vulpes lagopus* and large pools for Grey Seals *Halichoerus grypus* and Beavers *Castor fiber*. The beavers were particularly imaginatively exhibited since visitors could enter a dark chamber which looked onto a glass-sided beavers' lodge which was dimly illuminated. Elsewhere in the park badgers were exhibited in a similar way with a dimly lit sett opening onto a dark shelter where the visitors could watch them.

Along the bottom of the valley a series of dams created a chain of seven lakes which were fed by a well-bore. These were stocked with a flock of Greater Flamingos *Phoenicopterus ruber*, Common Cranes *Grus grus* and many species of European ducks, geese and swans. To me, the most interesting enclosure was the one for waders. Sand and shingle was sculpted around the pool to mimic sand dunes and the effect had been enhanced by plantings of sea-lyme grass, sea buckthorn and brooms whilst sea shells and seaweed were scattered around. In addition to Wigeon *Anas penelope* and Shelduck *Tadorna tadorna* this enclosure contained groups of Oystercatchers *Haematopus ostralegus*, Common Curlews *Numenius arquata*, Stone Curlews *Burhinus oedicnemus*, Godwits *Limosa lapponica*, Green Plovers *Vanellus vanellus* and Redshanks *Tringa totanus*. Not only was this enclosure a wonderful spectacle it proved highly successful in that most of the occupants bred successfully. Many of these successes were recognised as first captive breedings in the U.K. These included curlew and oystercatcher in 1964, green plover in 1968 and stone curlew in 1969.

Walking around the other side of the valley there was a paddock for mouflon *Ovis orientalis*, a wild sheep from Corsica and Sardinia and a large paddock for a breeding herd of European Bison or Wisent. Other, large grass-floored enclosures housed European Lynx and European Brown Bears. Other smaller enclosures housed Red Foxes *Vulpes vulpes*, Coypus *Myocastor coypus*, Alpine Marmots *Marmota marmota*, Polecats *Mustela putorius* and a very imposing pair of Wolverines *Gulo gulo*. The Wolverine is largest of the Mustelids and is related to polecats, weasels *Mustela nivalis* and stoats *M. erminea*. It is an immensely powerful animal capable of killing prey much larger than itself - in fact picture a polecat ferret the size of a large dog and this would give some impression of the wolverine. Living as it does in the inhospitable, bitterly cold Northern parts of Canada, Alaska, Scandinavia and the U.S.S.R. it has adapted to living in harsh environments. This includes being able to gulp down enormous quantities of meat when it makes a kill and it does so very quickly to guard against losing its prey to larger predators like bears. Thus the alternative name for the wolverine, which is glutton, has now entered our language to describe a greedy person.

Large aviaries towards the top of the slope housed pairs of White-tailed Sea Eagles *Haliaeetus albicilla*, Booted Eagles *H. pennatus*, Snowy *Nyctea* (*Bubo*) *scandiaca* and European Eagle Owls. Great Witchingham for many years sent its park-bred young eagle owls to Sweden for a reintroduction programme which proved very successful. The other exhibit I can recall in this section of the park was a breeding troupe of Barbary Macaques *Macaca sylvanus*. The main range of this monkey is the Atlas Mountains where it lives in coniferous woodland which is snow covered in winter. It just qualifies as a European species because it is the so called ape of the Rock of Gibraltar, albeit there is considerable argument whether this monkey occurs there naturally or was introduced by man. Either way Barbary Macaques are now inseparable from the Rock of Gibraltar as are Ravens *Corvus corax* from the Tower of London.

I have purposely left mention of one exhibit until last - otters. The park had a nice otter enclosure from the beginning and the otters started to breed, something no other collection had achieved in the 20th century. Philip Wayre was one of the first to realise that the wild otter was in serious trouble in Britain through a combination of persecution (otter hunting was still permitted), habitat destruction and pollution. He decided something must be done and urgently. To orchestrate protecting or recreating suitable habitat and captive-breeding otters to provide stock for a release scheme he decided that he would form an Otter Trust. Initially he bought a suitable site in the Tamar Valley on the border of Devon and Cornwall. Here it was planned to establish a specialist collection of otters together with a park for Asian wildlife. This was before Ken Sims opened his Asian Wildlife Park at

Thrigby Hall, near Great Yarmouth. Plans were well advanced when some local people started a campaign to ensure that planning consent would not be granted and the local council bowed to this pressure. I must admit that I find it extremely tiresome that so many people lack the energy, initiative and vision to do anything worthwhile themselves yet seem perfectly prepared to expend endless effort in thwarting the plans of others. But there, I do plead guilty to being a grumpy old man!

Whilst plans for an Asian collection were in hand a number of suitable animals were acquired as they became available and these were housed pro tem at Great Witchingham. Prominent in my memory is a wonderful pair of Temminck's Golden Cats *Felis temmincki*, the last examples of this beautiful cat I recall seeing in Britain. The Temminck's golden cat comes from South East Asia and is very rare in European collections although I have seen many examples in Thai zoos. It has a large range and seems to vary considerably in size. Some are almost the size of pumas whilst others are much smaller. My memory is that the pair kept at Great Witchingham were large animals.

After the failure of this West Country venture Jeanne and Philip Wayre bought a site at Earsham near Bungay on the borders of Suffolk and Norfolk and established the Otter Trust. Although the main focus was on breeding the European Otter *Lutra lutra* to produce stock for restocking restored habitat Oriental Small-clawed Otters *Amblonyx cinerus* and Canadian Otters *L. canadensis* were also kept and bred at Earsham. I also saw an African Spotted-necked Otter *L. maculicollis* at the Trust, the only one I have seen in the U.K. To the best of my recollection this was a singleton and therefore this species is yet to be bred in this country. Although a few birds such as ducks, geese, night herons and European eagle owls along with some deer were kept at Earsham to add interest and variety to the collection the plan to combine the otter trust with an Asian Wildlife Park was abandoned.

I have tried to briefly describe the collection on show to the public, but behind the scenes were many more animals. These tended to be species difficult to display to the public like stoats, weasels, Brown Hares *Lepus europus* etc. or birds which needed an undisturbed environment to breed, particularly the smaller softbills. A number of very large, heavily planted aviaries were built in the private area at Great Witchingham and several interesting breedings were reported including the first captive breeding of the Wheatear *Oenanthe oenanthe* in this country in 1965.

Great Witchingham was incredibly successful in establishing regular breeding groups of many birds and mammal species and much of this success must be attributed to the skill and dedication of the Park Manager, Roy Grout. Roy, like so many skilled stockmen always appeared quiet and unassuming when one visited the Park, but his knowledge and ability quickly became apparent and he was generous in sharing his fund of information. But this would only be offered if asked for: Roy would never offer gratuitous advice. Roy provided me with a great deal of help and advice and I owe him a considerable debt of gratitude.

And what has become of the Norfolk Wildlife Park? Well sadly it is now only a memory. At its peak this collection attracted over a quarter of a million visitors each year which adequately covered the huge running costs. However, by the 1980s most zoos recorded downturns in attendance and I would guess that Philip Wayre and his wife, as they got older, found running two collections at Great Witchingham and Earsham increasingly arduous. Eventually the Norfolk Wildlife Park was taken over by new management allowing the Wayres to concentrate on running the Otter Trust. So sadly the Ornamental Pheasant Trust and the fabulous collection of European fauna at Great Witchingham are now collections of the past and I regard myself as incredibly fortunate to have known them from beginning to end.

The Otter Trust at Earsham has now also been closed. However, this is because of the great success of the venture. The Otter has made an excellent comeback and most suitable habitat is now occupied. Even where this has not occurred it is reasoned that otter populations are now so healthy that natural dispersal will achieve expansion of distribution without releasing more captive bred animals. Also, at their ages (Philip is 90 years old), the Wayres richly deserve a more relaxed lifestyle. After all, during very full lives they have contributed so much to conservation.

Although the Wayres no longer keep livestock, they have a little house in Barnard Castle where they can stay during their regular visits. This is close to their estate of a thousand acres of fell in the north-east Pennines on the borders of Durham and Northumberland. This estate is populated by breeding Curlew, Redshank, Golden Plover, Snipe, Lapwing and a good mix of other species. This has great value as a conservation area and gives the Wayres considerable pleasure bird-watching.

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BREEDING THE CAPE ROBIN-CHAT *Cossypha caffra*

by Llŷr Davies

Natural history

The Cape Robin-chat is a small passerine belonging to the Old World flycatcher family Muscicapidae. It is evaluated as Least Concern, being described as common and widespread, having an extremely large range of over 1.6 million km^2. It is mainly a resident breeder in 15 southern and eastern African countries, ranging from South Sudan to South Africa. Suitable habitats include forest, grassland, savanna, scrubland as well as artificial areas, where it forages omnivorously around at ground level, primarily for invertebrates. A cup-shaped nest of coarse vegetation, lined with finer material is built by the pair.

Cape Robin-chat sitting on eggs.

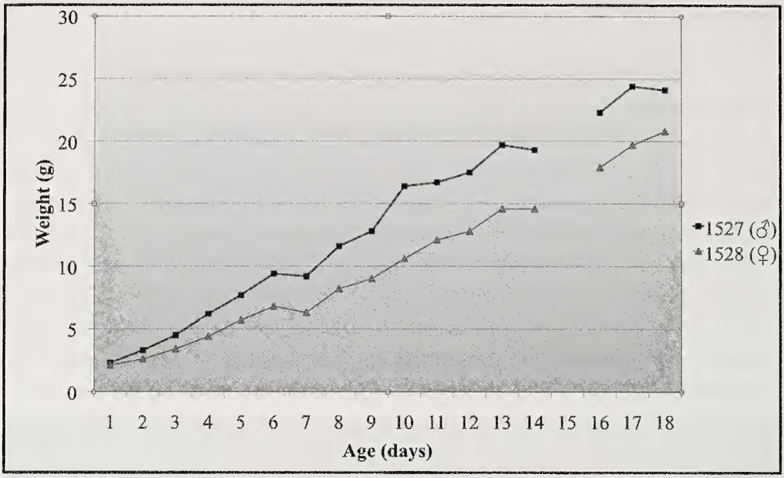
Description

Adults are grey, with black cheeks separated from the crown by a white supercilium. Orange extends from the chin to the breast and from the rump and under-tail coverts to the outer tail feathers, the central tail feathers being greyish-brown. Juveniles are speckled with buff on dark brown upperparts and grey-brown on buff below.

Breeding

Waddesdon Manor Aviary acquired three unsexed birds in April 2009, which were later DNA sexed as males. A juvenile female was acquired in August the following year. A pair was made up from these birds in

Figure 1. Growth rate of Cape Robin-chat chicks.



March 2011, in an on-show aviary housing a pair each of Emerald Doves *Chalcophaps indica*, Pink-headed Fruit-doves *Ptilinopus porphyreus* and Javan Banded Pittas *Pitta guajana*. The Emerald doves were moved to another aviary the following week. A fortnight after being paired, the birds were observed nest building. At the end of June, a nest containing two eggs was found in a dense bunch of yew branches, a couple of metres long, which had been placed in the back corners of the aviaries heated indoor shelter. A week later these eggs were candled, found to be infertile, removed and the nest was destroyed. After building a further six nests and laying eight more infertile clutches, at the end of May 2012 the 9th clutch (2 eggs) was removed for artificial incubation, and were fertile. All nests were built at heights between 1-1.5m from the floor, and consisted of a large base of copious coarse vegetation (bamboo leaves, moss, twigs and rootlets), within which the nest cup was lined with finer material (coconut fibre).

Artificial rearing

The eggs were incubated at 37.5°C, 50% humidity and turned automatically every hour. At pip, the eggs were placed in an artificial nest cup lined with absorbent paper and a scourer base for the chicks to grip. Both chicks hatched on the 8th June, after a fortnight's incubation. We brood chicks in Brinsea Parrot Rearing modules, starting at 36°C, gradually reducing the temperature as the chicks mature and show signs of overheating. They were fed blended pink mice and papaya (1:1 gradually increasing to 2:1) every hour from 6:00-23:00, decreasing in frequency by half-hourly increments, about every three days. Their first feed was at six hours old. By eight days old, their brooder's temperature had been decreased to 34.4°C, but was raised again by a degree to increase their appetite, due to a loss in weight the previous day. A couple of days later, their eyes had started to open. The chicks fledged at 17 days old, and were placed in a heated rearing cage with perching of various heights.

Parent rearing

The pair's 10th clutch (three infertile eggs) was removed and the nest destroyed, to avoid disturbing a Javan Banded Pitta nest nearby. Within a week, a new nest had been built on the opposite side of the shelter, and the first of a clutch of three eggs had been laid; these hatched at the end of June. A variety of live food (crickets, mealworms and waxworms) was supplied five times per day. One of the chicks went missing from the nest after 10 days, but the other two fledged at three weeks old, and were reared successfully. A further three offspring from two clutches have been parent reared since.

Conclusion

After numerous infertile clutches in their first year together, the pair has since been very fertile, requiring management to avoid overpopulation. The reason for this year of infertility is unclear, but assuming the male was sexually mature, it may be that one or both of the birds were not behaviourally receptive to mating. Despite year-round breeding attempts, fertile eggs have only been laid between May and September. According to ZIMS, only six zoos worldwide have ever kept this species, and WMA is now the only collection to hold them. It is believed that this species was first bred in the UK by a private aviculturist, although we have been unable to identify them.

Only one of the 14 species of Robin-chat is classified as threatened with extinction: Heinrich's Robin-chat *C. heinrichi*. This elusive species is known from very few locations, mostly isolated forest fragments where its habitat is severely threatened, and its range and numbers are therefore suspected to be declining. It currently qualifies as Vulnerable. However, the treatment of the more closely related White-crowned Robin-chat *C. albicapilla* is likely to be most applicable to this species.

Citation

BirdLife International (2013) IUCN Red List for birds. Downloaded from http://www.birdlife.org on 19/07/2013.

NEWS FROM LORO PARQUE FUNDACIÓN
AUGUST 2013

by Dr. Matthias Reinschmidt

Our young Gang-gang Cockatoos *Callocehalon fimbriatum* have been growing rapidly and now they have fledged and are trying to eat independently. It will take several weeks until they become completely independent, but these young birds are on the right track.

Adult Fiery-shouldered Parakeet *Pyrrhura egregia*

Orange-crested Cockatoo *Cacatua sulphurea citrinocristata*

Cockatoos have completely different clutch sizes. The Major Mitchell′s Cockatoo *Cacatua leadbeateri* and the Rose-breasted Cockatoo *Eolophus roseicapillus* sometimes lay five eggs per clutch, other species like our successful Orange-crested Cockatoo *Cacatua sulphurea citrinocristata* breeding pair only lay one or at most two eggs per clutch. The female *C. s. citrinocristata* always lays a single egg per clutch, which for this reason we regularly remove from the first clutch so that each time a new egg is added in the second clutch. This year she has laid her first egg which hatched in the incubator and now the young bird is growing well in the rearing house. This parrot species is becoming rarer in Sumba, its Indonesian home island. According to recent estimates there are only about 500 individuals left, which are threatened by further habitat loss. Thus, for this parrot species kept in captivity a safety net population and genetic reserve must be systematically built, in order to conserve the species. Since these birds have a slow reproduction rate, this method needs to be set up for the longer term.

We are very happy about two young Blue-streaked Lories *Eos reticulata* that are currently developing in the park. This lory species has become rarer in captivity and is kept only by a few specialists. Therefore, it is so important to take good care of each young bird in order for the species to sustain itself in the long-term. The Fiery-shouldered Parakeets *Pyrrhura egregia*, rarely found in the aviaries of breeders, have a young bird that recently received its leg-ring. The flaming red wings of the adult birds shine with an intensity that makes them very attractive.

The Justus-Liebig University of Giessen has given Mr. Kiessling, President of Loro Parque and Loro Parque Fundación (LPF), the "Wilhelm-Pfeiffer" gold medal. He received the award as an honour for the contribution of Loro Parque and the LPF in the field of research and education of more than 500 veterinary students. These students were able to complete their practical studies in the clinic and in the breeding centre of the zoological institution which has the world´s largest, most diverse collection of parrots.

The "Wilhelm-Pfeiffer medal" also honours the contribution of the Loro Parque Fundación for the protection of species and habitats.

With this award, the University honours organisations and personalities which support development and progress in the scientific field of veterinary medicine. Loro Parque is involved in this field and has incorporated students and doctoral candidates of the German University for more than 30 years, so that they have had the possibility to perform their practical activities. Furthermore, important research in the field of semen collection and artificial insemination of parrots has been made, and the results can be used to contribute to the conservation of threatened species. In addition, the investigation at the University Giessen of avian bornavirus has been supported for many years.

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HALF-RIPE MAIZE AS AN IMPORTANT SUPPLEMENTARY FOOD FOR PARROTS AND PARAKEETS DURING BREEDING AND REARING

by Dr. Matthias Reinschmidt

We are often asked about which kinds of extra food can be given to parrots and parakeets during the rearing period. The answer is not simple, because, depending on the parrot species, the needs are very different. An additional feed that has worked especially well for many years in Loro Parque Fundación is half-ripe maize *Zea mays*. It comes freshly harvested from the plant, when the grains on the cobs have not yet become yellow and hard. Hard maize grains are taken by only a few species with powerful beaks, like cockatoos and macaws. The half-ripe, also called milky corn, is eaten by almost all parrots and parakeets, and even lories like it because it is soft, tastes sweet, and is easily digested. Especially when there are young in the nest, it is a very good rearing feed, which is always eaten greedily and stimulates the parents to feed their young.

In Tenerife, because it can be grown all year round, fresh half-ripe corn is available for us in sufficient quantities. In Central Europe however, maize is a purely seasonal plant that can be planted in April/March and harvested half-ripe in August. The solution is to store an adequate quantity in order to have the necessary food for the birds the whole year. Particularly during the breeding months between March and April when there is still no fresh milky ripe corn available. Therefore, it is recommended to prepare a supply during the previous year for the coming breeding season, by harvesting the half-ripe corn and then freezing it in portions, to be used when needed.

Maize is originally from Mexico and belongs to the sweet grasses. Today it is one of the most widely grown plants, covering 170 million hectares worldwide (about 24% of the area under cereals) and with about 850 million tonnes harvested every year. It is used primarily as a food and fodder plant and in recent years also increasingly as an energy crop.

If we examine in more detail the content of the corn (see table 1), we see the remarkably high proportion of carbohydrates. This is why this plant is an especially high energy food but, as with many grain varieties grown from wild grasses, it only has a small proportion of essential amino acids. Therefore, it is not advisable to feed it over long periods alone, even if almost all parrots eat it greedily. Half ripe corn is always only as a supplementary feed. If it is used too much it can cause acute deficiency symptoms. I remember an experience I had twenty years ago. A friend who bred parrots was at that time very proud that his pair of Red-billed Parrots *Pionus sordidus corallines* they

M. Reinschmidt

Blue-throated Macaw *Ara glaucogularis* eating fresh corn

had bred for the first time and had four young in the nest box. To encourage the parents to feed the young sufficiently, he gave them half-ripe corn in abundance. The parents were eager to eat this and to feed it to their young. The problem was that, when the young fledged and left the nest box, all four had rickets. This was due to the almost exclusive feeding of maize; an acute deficiency had been caused that was detected too late. If we examine the calcium/phosphorus ratio in maize, it is 1:26; a proportion of 2:1 would be the ideal. This explains the rickets that had occurred.

The recommendation is to include half-ripe corn as a necessity in the diet, but only as a supplement and stimulant, and never as the main food during the rearing period. Here we cut a corn cob into four or five pieces and give no more than two pieces a day to each breeding pair.

When the young fledge, the half ripe corn is usually one of the first foods that is tasted and eaten and thus helps the young to get used to feeding independently.

Table1: Average composition (whole grain)

The composition of maize grain fluctuates naturally, depending on the environmental conditions (soil type and weather) as well as on the cultivation techniques (fertilization, plant protection). Values per 100g edible portion, whole grain.

Components		Minerals		Vitamins	
Water	12.5g	Sodium	6mg	Vitamin A	185µg
Protein	8.5	Potassium	295mg	Thiamine (Vit. B1)	360µg
Fat	3.8g	Magnesium	90mg	Riboflavin (Vit. B2)	200µg
Carbohydrates	64.2g	Calcium	8mg	Nicotinic acid (Vit. B3)	1500µg
Fibre	9.7g	Manganese	415µg	Pantothenic acid.. (Vit. B5)	650µg
Minerals	1.3g	Iron	1.5mg	Vitamin B6	400µg
		Copper	240µg	Folic acid	25µg
		Zinc	1.7mg	Vitamin E	2000µg
		Phosphorus	215mg		
		Selenium	4–16µg		

1 mg = 1000 µg

The physiological energy value is 1377kj per 100g edible portion.

Literature

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AN ACCIDENTAL EXPERIMENT ON NEST AND CHICK RECOGNITION IN TAVETA GOLDEN WEAVERS *Ploceus castaneiceps*

by Annie Valuska and Chelle Plassé

Taveta golden weavers *Ploceus castaneiceps* are small birds closely related to finches. They are common throughout their range in Tanzania and Kenya and are popular additions to zoo aviaries due to their bright coloration, small size, and gregarious nature. They are colony nesters and, as their name implies, will build many ornate woven nests if provided with adequate material. Despite their showy nests, very little is known about their reproductive behaviour as they have rarely been studied in the wild or in captivity. Disney's Animal Kingdom's collection offers an excellent opportunity to study this species, as we have a group of over 100 individuals housed with many other bird species in a large walk-through aviary and we also have smaller groups in the Avian Research Centre (ARC), a facility which is inaccessible to park visitors and provides a quieter, more controlled environment. In an effort to learn more about this weaver species, members of our Science Team collected data on their behaviour at the nest. This article will focus on an "accidental experiment" that occurred with one group of Taveta golden weavers housed at ARC.

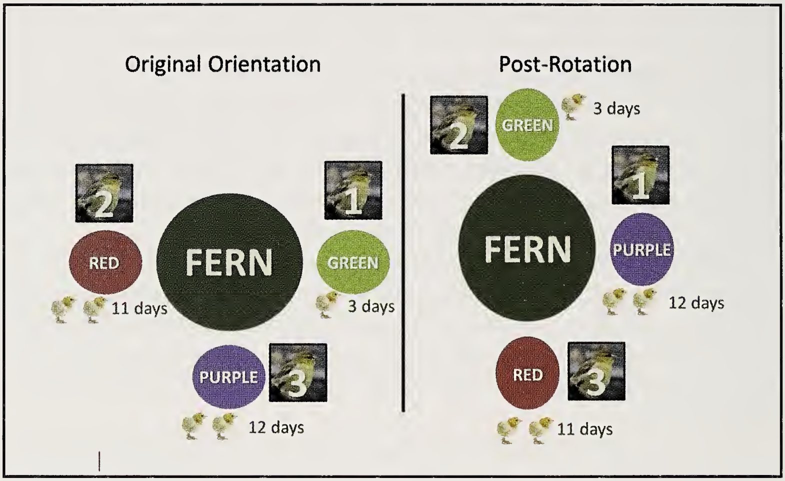
The ARC group is housed in an 9m x 6m x 2.5m (approx. 29.5ft x 19.7ft x 8.2ft) enclosure along with Carmine Bee-eaters *Merops nubicus*, Bartlett's Bleeding Heart Doves *Gallicolumba criniger*, African Pygmy Geese *Nettapus auritus*, a Green-winged Dove *Chalcophaps indica*, a Hooded Pitta *Pitta sordida*, a Jambu Fruit Dove *Ptilinopus jambu*, and Stone Partridges *Ptilopachus petrosus*. The birds are offered bowls containing soaked insectivore pellets, soaked parrot pellets, and dry insectivore pellets with finch seed, shredded carrots, chopped kale and some fruit mixed in, twice a day. They also have access to other species' diets, including soaked dog food, shredded carrots, chopped pinkies and small meatballs. All of the bowls get a finishing sprinkle of a variety of insects, including waxworms, mealworms, superworms and crickets. The enclosure contains a pond for the geese and is heavily planted with a variety of species, including Areca palms *Dypsis lutescens* and Bamboo grass *Bambuseae* spp., which the weavers commonly use to build their nests. A potted fern was hung from the overhead mesh above the pond, and it became a very popular nest site. Three nests were constructed there by a single male, and all were eventually occupied by three different females. The top of each nest was marked with a red, purple, or green pipe cleaner for identification, and 20 minutes of behavioural data was collected on each nest daily. During each observation, data collectors recorded the activity at the nest, noting the identity of any visitor, indicated by coloured leg bands, and whether it was near, perching on, or inside the nest.

After 14 days of observation on the Red and Purple nests and 10 days of observation on the Green nest, no nest had ever been visited by a female that was not the occupant. These data were consistent with occupancy data collected in our larger, walk-through aviary. In both groups, females were highly faithful to their own nests and did not go to other nests, nor did they tolerate female visitors to their own. On the 15th day of observation, the data collector came to ARC to find that the hanging fern on which all the nests were built had rotated, probably due to unusually high winds the evening before. For the first 14 days, the nests had been configured as depicted below, with Female 1 attending to her three-day-old chick in the Green nest, Female 2 attending to her two 11-day-old chicks in the Red nest, and Female 3 attending to her two 12-day-old chicks in the Purple nest.

Following the rotation of the fern, the nests essentially shifted 90° counter clockwise. Even though the nests rotated, however, the females did not rotate with them. Instead, the females continued to care for the chicks in the nest in the same location on the fern as their original nest, or, in the case of Female 2, the nest in the position closest to their original nest, as depicted below.

Not only were the females regularly visiting their "new" nests, but they were also all observed feeding the chick(s). This was especially interesting in the case of Female 1, who switched from feeding a single three-day-old chick to feeding two 12-day-old chicks, and Female 2, who switched from feeding two 11-day-old chicks to feeding a single three-day-old chick. So as not to interfere with the ongoing study, the fern was moved back into its original position after an hour of observation. Within minutes of repositioning, all three females were observed visiting their original nests and feeding their original chick(s). They continued feeding those chicks until fledging, and were never again observed switching nests.

Although this was only a brief "accidental experiment", and thus should be interpreted with caution, it does suggest some interesting things about Taveta Golden Weaver reproductive behaviour. Firstly, these observations indicate that females may rely very heavily on location-based cues to identify their own nests. This has been commonly observed in other species (Beer, 1970; Davies and Carrick, 1962; Tinbergen, 1953), but, to our knowledge, has never been demonstrated in Taveta Golden Weavers. In the wild, Taveta weaver nests are usually woven on tree branches, which are unlikely to shift location; thus, it would be adaptive to rely on those stable locational cues to identify a nest. However, our observations suggest that the weavers do have some flexibility: Female 2 was attending to a nest that was in a different location from her former nest. She may have been able to do this because 1) the spot her old nest had occupied was completely vacant after the shift and 2) her new nest was in a spot that had been vacant prior to the shift. This is consistent with the behaviour of some other avian species that have been studied (Nero and Emlen, 1951; Peek et al., 1972), though not all (Lashley, 1915; Nice, 1943).



These data also suggest that females may not be able to identify their own chicks, at least not before 12 days of age, which was the age of the oldest chicks at the time of the shift. It would be interesting to see if the females recognize their offspring when they get closer to fledging (18 days of age), as occurs in other species. For example, Red-winged Blackbirds, which fledge at 11-12 days of age, do not appear to recognize their own three to four-day old chicks, and if a female's chicks are replaced with unfamiliar ones at that age, she will care readily for the foster chicks. However, if the chicks are swapped at seven days of age, she will follow her own chicks to their new location, probably through the use of auditory cues (Peek et al., 1972). There are some species, however, which appear to never learn to recognize their own offspring in the nest, such as Kittiwakes (Cullen, 1957), Tricolored Blackbirds (Emlen, 1941), and Black Phoebes (Kinsey, 1935). More work is needed to learn at what point, if any, Taveta Golden Weavers are able to recognize their young. From an applied perspective, it would also be interesting to see if all three of the females would have continued to feed their foster chicks until fledging, particularly the female who switched from 11-day-old chicks to a three-day-old chick. If so, this would suggest that we may be able to successfully cross-foster a much broader age range than has been traditionally thought. This could have important implications for captive breeding protocols for Taveta golden weavers.

Behavioural data is still being collected on the Taveta weavers at ARC and in our walk-through aviary. We are learning a lot about their reproductive behaviour and have plans to further explore some of the questions raised by this accidental experiment in the future.

Acknowledgements

Special thanks to Caitlin Tolliday and Jess Beaulieu, who collected some of the behavioural data, and aviary keepers Shawnlei Breeding, Glorieli Quinones, Brent Nelson, and Christy Sky for their excellent care of these animals.

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AN AVICULTURAL REVIEW OF LIVING COASTS, TORQUAY, DEVON, UK.

By Simon Tonge, Clare Rugg and Jo Gregson

Introduction

Living Coasts is an exhibition of marine biodiversity located on the harbourside at Torquay, Devon, UK. It was opened to visitors in July 2003. The exhibit was developed by Paignton Zoo Environmental Park using funding from the zoo itself matched by external grants.

The site is owned by Torbay Council and is leased to the zoo for 125 years. It measures approximately 5000m^2 and is situated on a south-east facing promontory on the north side of Torquay harbour. At the commencement of construction the site largely consisted of bare reinforced concrete slabs with the remains of granite arches, which had been part of a marine spa, at the southern side.

Until 2012 Living Coasts had six major exhibits consisting of an aquarium, fur seals, penguins, auks, waders and sea ducks, but in that year the sea duck exhibit was converted to keep otters. Covering the whole thing is a polyethylene net, 19 metres high which serves to keep free flying birds within the exhibit and excludes others, such as the local population of Herring Gulls *Larus argentatus*. In total the exhibit has 650 metres of public walkway which are deliberately convoluted in order to disorientate visitors, allow good use of the available space, and maximise visitor stay on what is a relatively small site.

All five of the major external exhibits have pools up to 3 metres deep faced with acrylic windows which allow underwater viewing. All the pools except the wader exhibit are connected to a single water system using raw seawater pumped in from Tor Bay. The water is treated using a protein ‘superskimmer’. Water parameters set by the zoo required 10 metres clear visibility without sterilisation of the water that would prevent colonisation of surfaces by marine animals and plants. The wader exhibit, a facsimile of a local estuary, contains fresh water on a muddy substrate with a simple cartridge filter, which increases the period between needing to dump water via the sewer when dirty.

Planting and landscaping around the exhibits were carefully considered. Individually they were too small to be convincingly themed as the habitats of the bird species therein and so a theme of British native coastal planting was chosen in order to unite them. Artificial rockwork was designed to match the natural rocks on nearby headlands.

Underwater viewing in the exhibit is mostly in an undercroft area where the majority of the interpretive material is also concentrated. Further background information on the construction of the exhibit can be found in Tonge (2005a; 2005b).

The Mission

Living Coasts is managed as a subsidiary of Paignton Zoo Environmental Park. There were a variety of commercial reasons, beyond the brief of this paper, why the zoo chose to develop Living Coasts. From the biological perspective, the zoo had planned to redevelop its old African penguin *Spheniscus demersus* exhibit in due course but lacked the finance to construct an exhibit of suitable quality. The Living Coasts site, with its proximity to both a source of clean, cool, seawater, and fresh sea breezes to counter the threats from aspergillosis and the mosquito vectors of avian malaria, was felt to be an excellent site on which to maintain seabirds in general.

The opportunity to create a state of the art exhibit for the zoo's penguins was too good to miss. However, of much more importance was the opportunity for the zoo to fulfil its conservation and education mission in a subject area, coastal and marine conservation, in which it had never operated before.

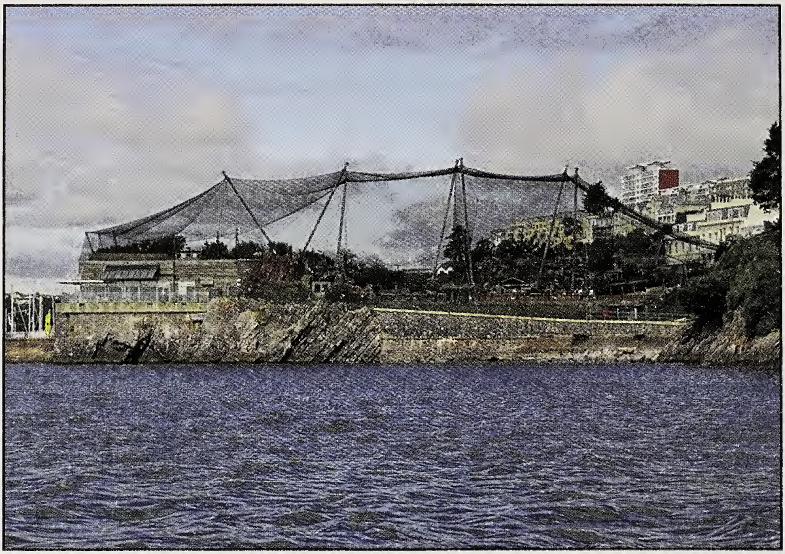
Seabirds were chosen as the primary focus because of our belief that visiting seabird colonies is one of the most inspiring natural history experiences of all. The intention was to try to recreate the noise, vibrancy, and, maybe, the smell of such places. As many seabirds obtain most of their food under the water rather than on its surface, there were great opportunities for underwater viewing and so acrylic windows were installed in all the pools.

Aviculture at Living Coasts

The site has now been in operation for ten years and it was felt that that a review of its avicultural achievements would be of interest. A full list of species maintained at the site is shown on p.127. The site has been organized in a series of ecologically appropriate exhibits for maintaining different taxa and this review will discuss each exhibit in turn.

Penguin Beach

The first exhibit seen by visitors is Penguin Beach. The exhibit is designed to resemble the habitats used by nesting colonies of African Penguins *Spheniscus demersus* in southern Africa. The land area of the exhibit is 307m^2 and the pool is 143m^2. The water is shallow to the back end but the majority of the pool is less than 3m deep which allows for vigorous swimming and diving. African penguins nest in holes so 30 artificial burrows



Gull and tern aviary.

Tufted Puffin *Fratercula cirrhata.*

Living Coasts avian inventory 2003-12

English name	Scientific name
Gentoo Penguin	*Pygoscelis papua*
Macaroni Penguin	*Eudyptes chrysolophus*
African Penguin	*Spheniscus demersus*
Bank Cormorant	*Phalacrocorax neglectus*
Common Eider	*Somateria mollissima*
Spectacled Eider	*Somateria fischeri*
King Eider	*Somateria spectabilis*
Common Scoter	*Melanitta nigra*
Long-tailed Duck	*Clangula hyemalis*
Green-winged Teal	*Anas crecca crecca*
Bufflehead	*Bucephala albeola*
Barrow's Goldeneye	*Bucephala islandica*
Hooded Merganser	*Lophodytes cucullatus*
Eurasian Oystercatcher	*Haematopus ostralegus*
Black-tailed Godwit	*Limosa limosa*
Redshank	*Tringa totanus*
Ruff	*Philomachus pugnax*
Black-necked Stilt	*Himantopus mexicanus*
Pied Avocet	*Recurvirostra avosetta*
Red-legged Kittiwake	*Rissa tridactyla*
Caspian Tern	*Hydroprogne caspia*
Common Tern	*Sterna hirundo*
Sandwich Tern	*Thalasseus sandvicensis*
Inca Tern	*Larosterna inca*
Common Guillemot	*Uria aalge*
Pigeon Guillemot	*Cepphus columba*
Tufted Puffin	*Fratercula cirrhata*
Red-billed Chough	*Pyrrhocorax pyrrhocorax*

were created and dug into an artificial sand dune. A second, pebble beach, nesting area designed for species that do not nest in burrows has been created on the opposite side of the visitor path.

Access for the penguins onto the public walkways is unrestricted, thus allowing visitors to get a close and satisfying encounter with the penguins, but on the latters' terms. The birds seem perfectly relaxed even in noisy and crowded situations, presumably reflecting their normal behaviour in a natural colony.

African Penguins are renowned for being reluctant swimmers in zoos, very different in their behaviour from their close relative, Humboldt's Penguin *S. humboldti*. For this reason we planned to add a more pelagic species to the colony and Gentoo Penguins *Pygoscelis papua*, the best swimmers of all, were obtained from Sea World in Orlando. We were fully aware that, with the sole exception of the remarkable colony at Edinburgh Zoo (Wheater 1976; Stevenson et al. 1994), this species normally requires refrigerated accommodation in European zoos. Nevertheless we felt that the site of Living Coasts and the availability of natural seawater gave us a chance of managing this species successfully. We were wrong. The mild summers in southern England are simply too warm and the species suffered debilitating thermal stress and regular aspergillosis leading to unacceptable levels of mortality. For this reason the surviving birds were transferred to Edinburgh Zoo in 2007.

Edinburgh very kindly donated a flock of 12 Macaroni Penguins *Eudyptes chrysolophus* to Living Coasts in 2005. Whilst not being such frequent swimmers as the Gentoos, they still swim regularly and are a striking species physically, very popular with visitors. By the end of 2012 the colony had increased to 25 birds and is one of only two successful breeding flocks in European zoos. Nevertheless the genetic base of the flock is rather small and the age pyramid is too narrow so it will take careful management and close co-operation with other holders to ensure that the flock has a long term future.

S. demersus is a prolific species in captivity and it has been necessary to control reproduction in this species by the removal of eggs. Nevertheless over 100 birds have been exported to other collections to date.

As an Endangered species the African Penguin has been a key focus for Living Coasts' conservation and education efforts. Links have been developed with the Southern African Foundation for the Conservation of Coastal Birds (SANCCOB) and Living Coasts has supplied financial and logistical support to that organisation.

The penguin exhibit is arguably the most important exhibit at Living Coasts in terms of visitor enjoyment. Diving experiences with the birds are now regularly offered and are very popular with both the public and the birds alike. Sub-adult Macaroni penguins spend considerable periods of time in the water and will interact endlessly with divers.

Bank Cormorants

The EAZA Pelecaniform Taxon Advisory Group was approached by SANCCOB to see if European zoos could assist in the development of a captive flock of the Bank Cormorant *Phalacrocorax neglectus*. This is an Endangered seabird with a global population of about 3200 pairs, endemic to the coasts of southwest Africa. A CAMP process in 2002 had identified that the species had declined by about 60%, for unknown reasons, during three generations, and had recommended that a captive population should be established to work out husbandry methods. During restoration work on the jetty at Robben Island during the summer of 2002/3 several Bank Cormorant nests had to be removed. Eggs were taken and attempts were made to hand rear the chicks to provide the founding stock for the captive population. Ultimately only three birds were reared but they came to Living Coasts in June 2004. Two males still survive and are in excellent condition but to date it has not proved possible to obtain females to pair with them. The future for this programme is currently uncertain.

Wader Estuary

The wader exhibit at Living Coasts presented a special challenge. How could full-winged birds be encouraged to remain in one section of such a large aviary? The natural barriers for wild animals are those formed by habitat. Therefore the artificial habitat had to be planned with meticulous care to ensure that the birds would choose to dwell in their designated area. Using design concepts developed at Rheine Zoo, Germany (Salzert & Schelshorn 1979; Salzert & Johann 1994) several major habitat types were included in the design and the waders did stay in their assigned area. This is the only pool to contain fresh water and the birds chose not to settle on any of the salt water pools. A soft sand beach area was constructed which also included a wave machine set to gently move the water across the beach edge. A short grassy area and some more tufted landscaping were shaped for ruff to lek and shelter in. The addition of a secluded slow running stream from the back of the exhibit suited the Redshanks very well.

Wading birds were imported over a four year period beginning in 2001. The species were selected based on their natural habitat type and their ability to mix with other species. Pied Avocets *Recurvirostra avosetta*, Ruff *Philomachus pugnax*, Black-necked Stilts *Himantopus mexicanus*, Redshank *Tringa totanus* and Black-tailed Godwit *Limosa limosa* were all brought into the collection.

These birds live in brackish or fresh water. They can be found on estuaries, or in smaller niches such as sewage farms, harbours or wet grassland. Most of them will move small distances throughout the day following the tide. The godwits are slightly different and will often fly a little further onto nearby farmland as the tide rises. For that reason it soon became apparent that they did not fit into our aviary mix. They were often found in other parts of the aviary, and were soon taken out of the collection plan. More recently Eurasian Oystercatchers *Haematopus ostralegus* have been added to the exhibit. Initial concerns that they may dominate or even predate smaller species have proved unfounded and they have settled well with the other species.

The waders have generally been successful at Living Coasts and in the spring the avocets and ruffs, in particular, provide a striking and memorable experience for visitors. Most species breed freely but there have been some challenges. We have learnt that the optimum number for avocets is about thirty birds; otherwise density-dependent factors lead to reduced nesting success. Redshanks are entirely self-sufficient and rear their own chicks in the denser grassy areas. Ruffs have not proved able to rear their own young in the aviary, but the females are very cryptic nesters and so it has proved difficult to find the nests to retrieve the eggs without causing unacceptable levels of disturbance to other species. Some enclosure modifications have recently been made which hopefully will allow us some greater control over the ruff flock in the future.

Over a 10 year period, wader hatchings include 167 avocets, 153 redshanks, 25 ruff and 13 black-necked stilts and 99 birds of three species have been supplied to other breeders.

Auk Cliff

Auks are traditionally thought of as difficult birds to keep in captivity but, as new husbandry techniques have developed over the last 20 years, some of the challenges have been met and a number of species are now self-sustaining in captivity (Gunther 1994; Douma & Carlso 1994). A fundamental requirement is that they must have clean, ‘lively’, water. In particular, the surface water must remain free of debris and grease. As the birds surface from a dive, any oil or grease on the surface is likely to collect on their plumage and compromise the waterproofing properties of their feathers. Once water finds its way into the insulating layer of feathers the bird will become chilled and other ailments will surely follow. The primary source of oil into the ponds is the birds’ food and so care is taken to source good quality fish with as low oil content as possible. Sprats *Sprattus* spp.

are the main food supply supplemented with smelt Osmeridae, whitebait and squid. Stagnant or still water also attracts mosquitos which can carry malaria to the birds. The Auks' pool at Living Coasts was designed with these specifications in mind.

A powerful wave machine keeps the water moving and drives the surface water towards a horizontal slot at water level about mid-way along the back cliff. The shape of the pool is such that there are no corners where debris could be missed by the skimming action. At the other end of the pool there is a tip bucket that works on a pivot action and when the bucket is full of water it tips 900 litres into the pool. This causes turbulence both at the surface and below the water helping to keep the water active and moving towards the skim slot.

Eighteen Tufted Puffins *Fratercula cirrhata* have been hatched in this exhibit. Their nest boxes are placed behind a backdrop of artificial rockwork. Plastic drainage pipes are used to form tunnels leading from the rock face to the hidden nesting box.

Puffins, like many seabirds, are vulnerable to aspergillosis. Building a seabird colony near clean coastal air and using cold natural sea water has greatly reduced the risk of the birds contracting lung ailments. Care is also taken about the type of nesting material used in the enclosed nesting spaces. Pebbles are placed in the boxes as a non-slip base, and pine needles are offered to the birds ad libitum to carry out their own nest building. Pine needles are known to be less prone to carry fungal spores than many other plants. Other auks bred within this section include nine Pigeon Guillemot *Cepphus columba*, and twenty-three Common Guillemot *Uria aalge*. The latter species nests on rock faces in the open and has strongly precoccial chicks. The puffin and common guillemot populations are now self-sustaining in the aviary but the Pigeon Guillemot, which is a hole-nesting species, has not been able to compete with the two larger species and the population is now no longer viable.

Sea Duck Pool

Apart from Common Eiders *Somateria mollissima* marine anatids are rarely exhibited in zoos. This is because of their susceptibility to aspergillosis and to infection by parasites unless they have access to very clean water. One exhibit at Living Coasts was initially given over to sea ducks. However, because of their poor exhibition value in summer when they are in eclipse plumage, inactive and moulting, in 2012 their exhibit was converted for otters. Spectacled Eiders *Somateria fischeri* and King eiders *S. spectabilis* are still retained in the collection and now co-habit with the penguin colonies. In winter, when all the sea ducks were in their breeding plumage and were performing their various courtship displays the sea duck pond was a wonderful and engaging sight.

The inventory (p.127) shows the variety of sea ducks that were held in the exhibit. Common and Spectacled eiders have bred regularly but the King eider pair have only once produced fertile eggs and these failed to hatch due to an incubator malfunction. Barrow's goldeneye *Bucephala islandica* bred freely but the chicks had to be hand-reared because they cannot survive on sea water. Long-tailed ducks *Clangula hyemalis* were routinely bullied by the Barrow's goldeneye males until the latter species was phased out of the collection but even then seemed to be intimidated by the larger eiders. So no reproductive activity occurred. The male Common Scoter *Melanitta nigra* regularly courted female eiders but ignored the two female scoters so the trio was sent to join the breeding programme for this species being developed by the Wildfowl & Wetlands Trust.

Gulls & terns

Probably the most successful species at Living Coasts has been the Inca tern *Larosterna inca*. The environmental conditions within the aviary appear to be perfect for this species and the terns are the only birds that make full use of the whole flying volume available. Even storm force winds and driving rain cause them no difficulty whatsoever; they never touch the net, and they never get ill. They also give great pleasure to visitors by their tameness and beauty. They breed freely in the aviary in any hole that they can find and the major challenge is actually to control their numbers. By the end of 2012, 162 birds had been sent to other collections.

Other tern species maintained in the aviary have proved much more challenging. The Common terns *Sterna hirundo* always seemed to have problems with the waterproofing of their feathers and, when flying, often scraped their primary feathers on the aviary net causing abrasion and asymmetry which affected their flight control. The Caspian terns *Sterna caspia* rarely flew in the aviary, despite its great volume, and developed a variety of ailments without a clear pattern. Our current view is that we would not try to maintain terns, other than Incas, in the future.

Six Red-legged kittiwakes *Rissa brevirostris* were obtained from the Alaska Sea Life Centre in 2003. Unfortunately all were females. Four birds still survive and are in good condition, regularly making nests. Despite repeated attempts it has not proved possible to source male birds so this species will die out. It is the intention to replace them with Black-legged Kittiwakes *Rissa tridactyla* in due course.

Conclusions

Living Coasts was developed as a zoo without cages where people could mix freely with animals and learn about them in a lively and entertaining way. The design of Living Coasts was aided by experience gained during the construction and maintenance of the Seal & Penguin Coasts exhibit at Bristol Zoo and freely shared by those involved (Dow & Bertram 2005). By carefully designing the environment, and choosing the appropriate livestock, a comfortable exhibit where the animals are relaxed, even when in close proximity to people, has been created to the benefit of both parties. The natural advantages of the site, discussed above, have allowed the maintenance and exhibition of species that will always be challenging to keep in more conventional zoo settings unless very significant resources such as refrigeration and air conditioning are supplied.

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FEATHER DAMAGING IN AFRICAN GREYS - GROUND-BREAKING RESEARCH

by Rosemary Low

The most serious behavioural problem encountered by companion parrot keepers is feather plucking and other feather damaging behaviours. It is no coincidence that this is frequently encountered with the most intelligent species: Greys, macaws and cockatoos.

Because the problem is so common and so serious, in-depth research relating to its cause has been needed for several decades. It is fortunate for parrot keepers worldwide that Yvonne van Zeeland decided to make this topic the subject of her PhD thesis.

This has been published under the title of *The feather damaging Grey parrot: An analysis of its behaviour and needs*. Because this book is unlikely to be encountered by many parrot owners, I believe it is important that its content should be shared as widely as possible.

But first let me describe its totally unique cover. It shows a Grey Parrot, partly denuded on the underparts, plucking or preening its shoulder. The floor below its perch is littered with plucked feathers. Tilt the book forward to another angle and the picture changes (presumably laser imagery) to a perfectly feathered Grey: the plucked feathers have gone. Quite the most imaginative and appropriate book cover I have ever seen!

Its content, being a PhD thesis, is not so readily absorbed. However, its 281 text pages are quite enchantingly punctuated with the colour cartoons of Mandy Beekmans. I hesitate to call them cartoons because although they are humorous, they retain the essential characteristics of the species, and illustrate important research findings.

The author is a veterinarian and a certified parrot behaviour consultant. She is a qualified European Specialist in Zoological Medicine (Avian). She starts by explaining that an estimated 10-15% of captive parrots either chew, pluck, bite or pull their feathers. She states: “Although the consequences of this self-inflicted feather damage may be solely aesthetic, medical issues may also arise due to alterations to the birds’ thermoregulatory abilities and metabolic demands, haemorrhage and/or secondary infections.” Once parrots display feather damaging behaviour (FDB) it is often difficult to break the habit, with treatments generally yielding disappointing results. The outcome is often that the bird is given to a parrot sanctuary or it is euthanized.

FDB can be classified as among the abnormal repetitive behaviours which often develop in captive animals due to stress or aversive stimuli and/or the inability to perform species-specific behaviours. Parrots are particularly susceptible due to their intelligence (high-level cognitive abilities) and due to the relatively limited time span that they have been bred in captivity. Because of these characteristics, life in captivity is inadequate to meet the parrots' social, cognitive and behavioural needs, leading to FDB.

Yvonne van Zeeland and her other researchers regard it as a grooming disorder: when a bird is chronically stressed, excessive grooming can result, leading to FDB. It often develops at the onset of sexual maturity, suggesting hormonal influence. Cyclic or seasonal changes in the extent of FDB may occur, possibly associated with dry air in the colder months or hormonal changes during the mating season.

FDB may also be interpreted as a way of coping with stress, loneliness or boredom in a barren environment. Poor socialisation and absence of parents during the rearing period (resulting in failure to learn appropriate preening behaviours and routine) might also play a part. Eventually the behaviour may become ritualized and develop from a so-called maladaptive (trying to adapt to an inappropriate environment) to malfunctional behaviour (with abnormal brain function) - similar to addictions. This might, in part explain, why birds do not respond to treatment.

Part two of the thesis focuses on the value and efficacy of environmental enrichment for Grey Parrots. Results of the research are extremely important and should be known to all companion parrot owners.

Here I will divert from this important thesis to relate what my friend Winny Weinbeck told me about parrot foraging toys. She has dozens of them for her Grey, Galah and Blue-fronted Amazon. Faced with a difficult puzzle in a foraging toy, the Grey would never give up until it had worked out how to get at the food, whereas the Galah and the Amazon lost interest if the task was hard. This underlines the importance of stimulating tasks for captive Grey Parrots in particular.

Yvonne van Zeeland carried out various experiments in a controlled setting. One was extremely interesting in revealing what captive Grey Parrots find most important in their lives. The study was designed to determine how much effort parrots were willing to invest to gain access to specific types of enrichment, as an indication of their relative value to the parrot.

Six Grey Parrots were housed in a two-chamber set-up in which they were able to access specific resources by pushing a weighted door. The effort needed to gain access to the resource was gradually increased until a breakpoint was reached at which the parrot ceased to make successful attempts. Incidentally, the maximum pushing capacity of these six parrots was 732g (about 150% of body weight).

There were ten enrichment categories: destructible toys; non-destructible toys; foraging opportunity; auditory stimulation (a radio playing easylistening music and three sound-producing toys); three cage mates; ladder, rope and net; a large room, 6.5m long; a large bath; hiding opportunity; empty cage.

At the time of publication, there were results for three Greys. The most effort was expended to get into the large room. However, more time was spent moving around than flying. Yvonne van Zeeland told me that she thinks that this emphasises that parrots need to be let out of the cage and to be able to move around freely rather than being in a confined space. Living trees, play stands and the opportunity to go outside would therefore appear to be beneficial.

A lot of effort was put into spending time with other Greys, more or less equalled by food availability. There was no interest in hiding opportunities and only one bird wanted to bathe.

Some of the contents of this thesis are too technical for the reader who is not a veterinarian or scientist. So I have focused here on the important aspects of enrichment. As well as the above tests, eleven types of foraging enrichment were offered to the Greys, such as placing pellets in puzzle feeders. The enrichments were offered to the Greys to determine how effective these are in increasing foraging time, which is an important behaviour to stimulate captive parrots.

The Greys were housed in cages 80cm long, 60cm wide and 155cm high. Video recordings were used to analyse foraging times and activities. I will describe some of these devices to encourage parrot owners to provide similar opportunities.

- Four transparent plastic cups with lids dangling from a PVC pipe hung from roof of cage.
- Transparent acrylic wheel (diameter 15cm). Parrots needed to spin and turn the wheel to access food via a circular hole (2.5cm diameter).
- Honeycomb transparent acrylic feeder (8cm x 18cm) containing a cardboard box filled with food. The birds had to shred the box to reach the food. (The latter two are commercially available parrot foraging toys.)

One of the aims was to increase the time taken to extract the foods. In the wild, depending on the species and season, it takes parrots from four to eight hours daily to find and consume food. In a captive environment, these activities may take less than one hour and are too predictable and easy, unless the parrot must “forage” to obtain food. Foraging toys or puzzle feeders appear to be the most effective measures to increase activity, stimulate, alleviate stress and boredom and reduce and prevent aggression. Foraging enrichment is quite a wide term, which also included using multiple bowls or mixing food with inedible items. Both are examples of foraging enrichment, but less effective than the toys and providing food as larger-sized particles.

Experiments in contrafreeloading have been carried out with a number of captive animals. This means giving them the choice between free accesses to food or making them "work" for it. Let me mention again the Grey Parrot belonging to Winny Weinbeck. I watched Winny fill the cardboard centre from a roll of kitchen paper with various small items of food, wrapped up in paper. When placed inside its cage, the Grey immediately explored this, removed the items and ate them. Winny said it always "forages" in preference to taking items out of the food bowl.

Yvonne van Zeeland and her researchers studied healthy (eleven) and feather-damaging (ten) Greys on the assumption that the latter would feed from bowls in preference to feeding from toys. This assumption was proved to be true. FDB parrots spent approximately 21% of the feeding time foraging while in healthy birds this was approximately 50%.

The results underlined that in feather-damaging Greys the motivation for foraging toys is different. The suggested reason was they have ritualized their behaviour and it has become an addiction. Thus they may be less interested in enrichment (which therefore does not appear as effective).

These examples are just a small part of the trials and conclusions described. They highlight the fact that to try to prevent the onset of FDB in Grey Parrots the key is environmental enrichment.

It is of interest that the research and part of the printing cost of this thesis was funded by the Dutch Ministry of Economic Affairs, Agriculture and Innovation. This book costs €20, plus postage and is available from the author:

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BOOK REVIEW

PARROTS OF AFRICA, MADAGASCAR AND THE MASCARENE ISLANDS

Little was known about the biology and ecology of African parrots until Professor Mike Perrin and his colleagues at the University of KwaZulu-Natal set up the Research Centre for African Parrot Conservation. Mike has been the director for more than a decade. When I first met him in 1996 he told me that he was determined to initiate studies of parrots because the scientific focus in Africa had been mainly on the larger mammals: parrots were a neglected group. He had studied at the University of London and did his PhD at Exeter University but most of his working life has been spent in Africa.

His postgraduate students amassed a wealth of information, largely in the field, in various parts of southern Africa. The result is an extraordinarily detailed book (long awaited) of 612 pages (large format): *Parrots of Africa, Madagascar and the Mascarene Islands: Biology, Ecology and Conservation.* This is a heavy tome (about 3kg in weight). There is no equivalent relating to parrots of other continents.

A massive amount of information is contained within this work, concerning all aspects of the biology of African, Malagasy and Mascarene parrots, and existing knowledge of extinct and fossil parrots. Particular themes include the behavioural, ecological and species characteristics of parrots.

Chapter 2, entitled Conservation Biology, states that Africa has 175 million hectares of tropical rainforest - but African forests are being destroyed at a rate of approximately 228 hectares per hour or 2 million hectares per year. Mike Perrin writes: "… opportunities to raise awareness of the plight of African species among wildlife managers, legislators, researchers, birdwatchers and the public must be grasped at every opportunity."

This book brings sharply into focus the most crucial problems: deforestation and the poaching of young parrots from nests and capture of adult birds. Where legislation exists to protect wild-caught parrots from trade, lack of enforcement is a problem. "This issue must be resolved before many of Africa's parrots can be considered truly safe from extinction."

Note that CITES data showed that during a 15-year period, 500,000 Grey Parrots were documented in international trade. This figure approached the 1993 estimate of the wild population of only about 600,000 birds.

A remarkable wealth of information is found in the section entitled The

Parrot Species of Africa (pages 308-516). Details are provided under the headings of Description, Distribution, Conservation Status, Movements, Habitat, Habits, Vocalisations, Diet, Breeding and Taxonomic notes. Breeders will find photographs of sub-species (Meyer's, Jardine's) very useful for correct identification.

Lovebird breeders will learn a lot about the wild life of these birds. For example, red-faced lovebirds feed mainly on tall grasses, including cultivated millet, also sorghum. The seeds are eaten while climbing along the grass stalks. The species account for the peach-faced lovebird extends over 16 pages. It is selective in its diet, moving up to 3km from the nest site to feed on the seeds of wool grass *Anthephora schinzii.*

The 42-page bibliography and the 17-page (small type) index gives an indication of the research, detail and thorough coverage of this work.

Published by Wits University Press, the price in the UK is approximately £60. This is not expensive considering the quality of the production, the enormous number of interesting colour photographs and that this will surely be the definitive work on the subject for decades to come. No one with an interest in the parrots of Africa should be without this ground-breaking book. Mike Perrin and his colleagues can be immensely proud of their work and collaboration.

Rosemary Low

INTERNATIONAL TURACO SOCIETY MEETING

Avicultural Society members are invited to attend the ITS AGM at Cotswold Wildlife Park at 2pm on April 13th 2014. There will be talks by Aimy Caceres on her PhD study on deforestation in Angola and by Abby Bailey on a planned genetic study of captive turacos at Oxford Brookes University. Georgie Jefferies will also be offering a closer look at invertebrates. Admission to the meeting is free and booking is not required. Non-members of ITS will be charged admission to the Park.

NEWS & VIEWS

A NEW WEBSITE

The State of the World's Birds website provides a comprehensive overview of current and emerging conservation issues. Presented in a clear and exciting way, it is a synthesis of the work and knowledge of the Birdlife Partnership, as well as leading researchers and conservationists from around the globe. Through a searchable database of more than 350 case studies, the website examines why birds and biodiversity are important (INTRODUCTION), what we know about the changing state of the world's birds (STATE), why birds are declining (PRESSURE) and what can be done to improve their status (RESPONSE).

Each section introduces a number of overarching themes - supported by key messages and case studies - that together provide a benchmark against which ongoing efforts to conserve birds and biodiversity can be gauged.

A key focus of the website is to raise awareness of issues relating to Birdlife's strategic priorities, such as preventing extinctions, climate change, the marine environment, and the role of birds as indicators.

www.birdlife.org/datazone/sowb

* * *

LONGEVITY IN A LESSER FLAMINGO

The Ringing Scheme of East Africa has just received news of a Lesser Flamingo *Phoenicopterus minor* that was found freshly dead at Lake Baringo on 13th February this year with a ring. The incredible thing about it is that the ring was a BTO ring (British Trust for Ornithology) that was one of those rings used on a batch of several thousand Lesser Flamingo chicks which bred at at Lake Magadi in 1962!!

This bird was in fact ringed by none other than the very well-known Leslie Brown on 1st November 1962 making it 50 years, 3 months and 25 days old!

It must surely be the oldest recorded Lesser Flamingo and it is amazing that it lived for so long. A few years ago there was one recovered also at Magadi that was about 45 years old - there may be one or two more out there with rings from that time! If anyone reads this that knows more about that ringing event of Lesser Flamingo chicks in 1962 - or was perhaps even there and took part - it would be really interesting to know the full story.

I believe many of the chicks had got 'anklets' of encrusted soda which had formed around their legs and were acting as a 'ball and chain' thus killing the birds. Rescuers by breaking the balls of encrusted soda off and putting rings on were thus saving the lives of many flamingos - some to live for over 50 years!

The person who found the flamingo is Nick Armour of Swavesey, England, to whom the BTO is indebted for reporting the recovery of the ring. The distance from ringing site to recovery site is 242kms.

* * *

BLACK HORNBILL BRED AT BIRDWORLD

The Black hornbill is a large black and white, mainly tree dwelling bird with a long heavy bill. Originating from Thailand, Malaysia, Indonesia and Brunei, they are classified as near threatened on the IUCN status list and we are delighted to be able to report this successful breeding in captivity. The Black hornbill is an interesting bird as it uses a hole in a tree as a nest and when the female is ready, she goes into the hole and is sealed in with mud. A narrow slit is left for her to poke her bill through for feeding and the male brings food to her whilst she is in there. She breaks out of the nest after almost 3 months, but the entrance is then re-sealed by the chick, which is fed for a further month inside the nest. Our female mudded herself into her nest in the early summer disappearing from sight on 20th June. But this week she emerged with her chick, and as you can imagine, having not seen her since the early summer we were delighted to see her accompanied by a healthy baby!

* * *

BREAKTHROUGH IN CONSERVATION BREEDING PROGRAMMES

Many large parrots are threatened by extinction and species conservation breeding programmes may be of limited success due to problems with infertile eggs. Scientists of the Justus-Liebig-University Giessen, Germany, Faculty of Veterinary Medicine have developed a novel method to collect semen in more than 100 parrot species for the first time ever and use this for artificial insemination for the successful production of offspring. The working group around Prof. Dr. Michael Lierz co-operated with the Loro Parque Fundación, Tenerife, to evaluate this new procedure on more than 100 different species. In a first step, the method, based on electrostimulation was evaluated, and a cloacal probe designed. Using this technique, it was possible to collect parrot semen from one of the largest parrot collections in the world. Prior to this development, routine semen collection from large parrots was not possible. The Loro Parque Fundación, Tenerife also supported this project financially.

Semen collection from an Amazon parrot.

Now, with the possibility of semen collection, parrot semen quality can be evaluated and the fertility of the males assessed. This development is of enormous importance for species conservation breeding projects. Collected semen has also been used for the artificial insemination of endangered species, and females so far producing only infertile eggs successfully produced offspring. For the first time worldwide a chick of a macaw was produced using assisted reproduction techniques. This means that from now on, individuals who had never produced offspring before could be integrated into breeding programmes, enlarging the genetic base of endangered species in such programmes. This method was also used in the most highly threatened species e.g. Spix's Macaw *Cyanopsitta spixii*.

* * *

SOCIETY DONATION TO THE CORNCRAKE PROJECT AT WHIPSNADE ZOO

The society visited Whipsnade Zoo in September for the autumn social meeting and AGM. It was decided to make a donation to the corncrake project. The donation will go towards new incubation equipment for next season.

The corncrake is the only globally threatened bird to breed regularly in the UK. They started to disappear from the English countryside more than a century ago.

Corncrakes are migratory birds that travel from Africa to breed in the UK. They live on land, but are rarely seen in the wild as they live in thick vegetation, grassland and field corners, camouflaged by their brown feathers.

Modern farming techniques, the spread of fast efficient mowers that kill chicks and adults, and now the reduction in cattle numbers, which in turn reduces the need for hay and silage thus drastically reducing potential nesting areas, has hit the corncrake population

In 2002, ZSL, RSPB and Natural England created a partnership for the captive breeding and release of corncrakes. The birds are bred and hand reared by ZSL at ZSL Whipsnade Zoo and then released at the RSPB's Nene Washes nature reserve in Cambridgeshire.

At the beginning of June 2005 a wild male corncrake was heard calling at the nature reserve in Cambridgeshire. It was established that this bird had been bred at Whipsnade in 2004 and is excellent evidence that a captive bred and released, hand-reared bird had migrated to Africa and back (around 3000 miles), ending up less 2-3 km from its original release site.

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